



THICKSPIKE GAYFEATHER

Liatris pycnostachya Michx.

Plant Symbol = LIPY

Common Names:

Tall gayfeather, prairie gayfeather, blazing star, prairie blazing star, and hairy button snakeroot, Kansas gayfeather

Scientific Names:

Liatris pycnostachya var. *lasiophylla*
Liatris pycnostachya var. *pycnostachya*

Description

General: Thickspike gayfeather belongs to the sunflower or composite family (Asteraceae). *Liatris pycnostachya* is a tall, hardy, native perennial herbaceous species that has spectacular magenta inflorescences (Fig. 1). Single to multiple stems arise from a solid corm that is 3 to 4 inches (7 to 10 cm) in diameter and supports the plants fibrous root system. The simple non-branched stems are up to 5 feet (1.5 meters) tall. The species narrow, dark green leaves have a light-colored mid-rib and are alternately arranged on the stem. The numerous basal leaves are the longest and they gradually shorten in length farther up the stem. Both stems and leaves normally display short, stiff hairs. The inflorescence is a long spike composed of many sessile cylindrical flower heads 0.31 to 0.43 inch (8 to 11 mm) tall. Flower heads have 5 to 7 individual rose-purple flowers, each with 5 long, slender, pointed petals or bracts which tend to spread and curve back toward their bases. Bracts of this species may have a purplish tinge. Flowers are given a somewhat fuzzy appearance by extended white stamens (male flower parts) and pistils (female flower parts). Spike itself may be up to 24 inches (60 cm) of the stem length. Flowers bloom from top down so flowering covers an extended period of time. Flowers are cross pollinated with bumble bees and native pollinators doing most of the work. Fruit of thickspike gayfeather is a narrow, brownish, 10 ribbed achene that is 0.19 to 0.23 inch (5 to 6 mm) long, with tufts of bristles longer than the achene attached to its upper end. Harvest seed heads in the fall after they appear dry and fluffy, but before they are blown away by the wind. There are 131,000 seed units per pound or about 333,000 achenes per kg of seed.

Distribution: For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site. This plant ranges from Kentucky to Minnesota and eastern North Dakota south from there to Louisiana and eastern Texas. It grows naturally in the eastern 1/3 of Kansas. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Thickspike gayfeather grows best in low, moist, tallgrass prairies that are dominated by big bluestem (*Andropogon gerardii*). It may grow near the base of slopes since it requires more water than many of the other members of the genus *Liatris*. Weaver and Fitzpatrick (1934) found it on 56 percent of low prairies and only 25 percent of upland prairies that they studied. Although more prevalent in prairie areas, this forb is found in Texas and Louisiana on the western side of the pine belt in longleaf pine and bluestem areas (Grelen and Hughes, 1984; Grelen and Duvall, 1966). Art (1991) reported that gayfeather grew best on moist, well drained, and slightly acidic to neutral (pH 5.5 to 7.0) soils.



Figure 1. *Liatris pycnostachya* in bloom. Photo: R. Alan Shadow, USDA NRCS East Texas PMC, Nacogdoches, Texas.

Adaptation

Weaver (1954) indicated that *Liatris pycnostachya* was characteristic of areas supporting big bluestem and was rarely found in much drier or much wetter grassland areas. This species of *Liatris* is probably the least drought tolerant and may require supplemental irrigation to bloom vigorously in very dry weather.

Uses

Cattle graze thickspike gayfeather and it is considered a decreaser in pastures under heavy grazing pressure (Menhusen, 1973). Birds use the seed for food and rodents eat the corms. Thickspike is a particularly beautiful member of the genus *Liatris* with its height and large sized flowering spike. These flowering spikes make long lasting cut flowers since the heads will proceed to open just as if they were still on the plant. If the spike is air-dried rapidly in the dark, the flowering spike will retain much of its color for use in attractive, dry plant arrangements.

Ethnobotany

Kindscher (1992) indicated that the corm of thickspike was used by Native Americans and others to treat gonorrhea. Art (1991) indicated that it could be used to treat kidney diseases.

Status

Threatened or Endangered: Thickspike gayfeather is not listed as threatened or endangered (US Fish and Wildlife Service, 2020).

Wetland Indicator: Thickspike gayfeather is listed as a facultative upland plant (US Army Corps of Engineers, 2020).

Weedy or Invasive: This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, state natural resource, or state agriculture department regarding its status and use.

Please consult the PLANTS Web site (<http://plants.usda.gov/>) and your state's Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Planting Guidelines

Thickspike gayfeather is established in field and prairie restoration projects easiest from seed. Prepare a firm, clean, weed free seedbed by disking, harrowing, and cultipacking the planting site. Use chemical weed control to reduce competition from annual and perennial weeds. Contact your local extension weed specialist for herbicide recommendations. Site preparation should be completed whether drill planting or broadcast seeding. Plant seed units at a depth of ¼ inch (6 mm) for both seeding methods (Houseal, 2007). The preferred planting method is a drill equipped with a legume seed box and depth bands allowing correct depth placement of the seed unit and good seed-to-soil contact. A seeding rate of 30 pure live seed (PLS) units per 12-inch row spacing (30 cm) provides a consistent stand. Avoid seeding into a fluffy or loose seedbed because soil can fall back into press wheel tracks and bury the seed too deep after the first rain event. Broadcast seeding is an alternative method when site conditions are not favorable for drill planting. Broadcast seed using a carrier agent such as cat litter or sand to help prevent planting too high of a rate and for improving seed distribution. Use a cultipacker or roller to enhance seed-to-soil contact after broadcasting. Time plantings to rain events to help incorporate seed into the soil and improve establishment.

Adjust the seeding rate according to the desired percentage in the mix for prairie restoration or diverse wildlife plantings. Application of fertilizer the year of establishment is discouraged unless phosphorous and potassium are at extremely low levels based on your soil test for the planting site. Do not apply nitrogen fertilizer the first year because it will encourage weeds.

Management

Reduce weed competition by mowing newly established fields to a height above the established seedlings. To manage dead plant residue, burn prior to plant growth in the spring. Apply a non-selective herbicide such as glyphosate in the spring to remove early cool season species before plant regrowth begins.

Pests and Potential Problems

Rabbit protection might be required for gayfeather seedlings and newly developing shoots in the spring. Thickspike gayfeather stems tend to lodge in a monoculture situation. In a natural prairie setting other grass and forb plants tend to support the stems and keep them upright.

Environmental Concerns

Thickspike gayfeather does not spread vegetatively and seedlings are easy to control and maintain.

Control

Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Seeds and Plant Production

Direct seeding of thickspike gayfeather is not recommended for establishing seed production fields (Houseal, 2007). Seedling transplants or corm division for smaller areas are preferred establishment methods for seed production fields. Transplanting reduces time required to achieve a solid stand, allows the use of pre-emergent herbicides and reduces the amount of weed competition usually seen in fields started from seed. Seedling transplants are started by stratifying (cool-moist) seed for 8-12 weeks at 40°F. Sow stratified seed ¼ inch deep into transplanting containers two months before the last average frost freeze date and grow in the greenhouse (Houseal, 2007). Seedlings are ready for transplanting when they have a vigorous root system and small pea sized corm (Fig. 2). Place plants in a shadehouse for two to three weeks to harden off before transplanting. Transplant the seedlings at eight-inch intervals within the rows in a firm, weed free planting bed (Houseal, 2007). Allow enough space between rows for weed control and harvesting equipment.

Thickspike gayfeather corms can be divided after stem die back in the fall and stored for spring replanting. Divide the corms so each one has a growth point. Apply fungicide and store in slightly moist sphagnum peat moss at 28-30°F for a minimum of ten weeks before spring replanting. Do not allow the corms to thaw and refreeze or dry out during cold storage. After cold storage, corms can be stored up to two weeks at 40-45°F before replanting. Corms can also be divided in early spring and replanted immediately afterward. Plant corms 1" deep on 6-8 intervals in the row with no more than four corms per ft². Water corms as needed for the first three weeks after planting to provide a moist soil and promote establishment. Then allow soil to dry between waterings but not enough to stress the plants. A constantly wet soil promotes root rot development (Stevens et al., 1993).

Use a soil test to amend fertility (N, P, and K) per soil test recommendations after the first growing season. Lower fertility levels minimize warm season weed competition during establishment. Maintain isolation distances between fields of different *Liatris* species as they are known to hybridize with one another (Hadley and Levin, 1967; Houseal, 2007). Manage seed production fields by mowing/cultivating between rows, hoeing, hand roguing, or post emergent grass herbicide applications. Limit cultivation as *Liatris* plants are sensitive to soil disturbance when bolting or flowering (Houseal, 2007).

Plants of thickspike gayfeather can be grown from greenhouse seedlings or corm division using the methods as described above.

Seed is harvested in fall and maturity dates vary from September to October (Fig.4). Recommended harvest method is direct combining at maturity but before the spikes or inflorescence begin to shatter and seeds are dispersed by wind (Houseal, 2007). Minimize seed loss using low volume air settings. Scalp harvested material to remove stems and other chaff and air dry. Brush or debeard the seed to remove seed tufts or pappus before cleaning. Clean seed using a machine with air adjustments and separation screens to remove chaff and unfilled seed. Productive stand life varies from 3 to 5 years. Seed production is usually limited in the establishment year but increases in the



Figure 2. *Liatris pycnostachya* seedlings ready for transplanting.



Figure 3. Large *Liatris pycnostachya* corm showing growing points and roots.



Figure 4. *Liatris pycnostachya* seeds.

second and third year (Houseal, 2007). Store seed in a controlled environment of 50°F and 30% relative humidity to enhance seed longevity (Houseal, 2007).

Cultivars, Improved, and Selected Materials (and area of origin)

Select cultivars based on the local climate, resistance to local pests, and intended use. Consult with your local land grant university, local extension or local USDA NRCS office for recommendations on adapted cultivars for use in your area.

‘Eureka’ thickspike gayfeather is a cooperative cultivar release by the USDA-NRCS Manhattan Plant Materials Center (PMC) and the Nebraska Agricultural Experiment Station in 1975. The original collections of ‘Eureka’ were made in November 1970 in Greenwood County, Kansas. Plant height, vigor and stand of ‘Eureka’ were consistently superior to other gayfeather collections in comparative evaluations. Eureka is adapted to the eastern ⅓ of Kansas, western Missouri, southeastern Nebraska, northeastern Oklahoma, and southwestern Iowa. This species is used in range reseeding mixtures, roadside and park beautification and wildlife habitat enhancement. Foundation class seed is available from USDA, NRCS PMC at Manhattan, Kansas.

Northern Missouri Germplasm and Western Missouri Germplasm were released in 2001 by the USDA NRCS Elsberry, Missouri PMC in cooperation with the Missouri Department of Conservation and the Missouri Audubon Society of Jefferson City, Missouri. Generation 0 seed (equivalent to Breeder seed) is available in limited quantities from the USDA, NRCS PMC at Elsberry, Missouri.

Central Iowa Germplasm and Northern Iowa Germplasm are source identified releases made in 1999 by the USDA NRCS Elsberry PMC in cooperation with Iowa Department of Transportation, University of Northern Iowa, Iowa Crop Improvement Association, and the Native Roadside Vegetation Center in Cedar Falls, Iowa. Contact the Tall Grass Prairie Center, University of Northern Iowa, Cedar Falls, Iowa for commercial seed growers of these releases.

Pineywoods Germplasm is a selected class germplasm released in 2020 by the USDA NRCS East Texas Plant Materials Center (ETPMC), Nacogdoches, Texas. The original collection came from Montgomery County Texas in 2004. Generation 0 seed (equivalent to Breeder seed) is available in limited quantities from the ETPMC. Pineywoods Germplasm averages 178,000 seeds per pound.

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Citation

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